

Enhancement in critical current density via incorporation of nanoscale Ba₂(Y,RE)TaO₆ in REBCO films

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Technology Summary

The basic idea is to incorporate the phase Ba₂(Y,RE)TaO₆ into nanoparticles or vertically aligned nanocolumns within the superconducting film. Since this phase has a large lattice mismatch with REBCO or YBCO films, significant strain is generated. This can cause massive enhancement in the critical current density of the films. Also, this strain can cause vertical self-assembly of nanodots of Ba₂(Y,RE)TaO₆, into nanocolumns. The nanodots can also merge to form nanorods. Even when vertical self-assembly is not obtained, even randomly aligned particles of Ba₂(Y,RE)TaO₆ can cause massive improvements in pinning and J_c.

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